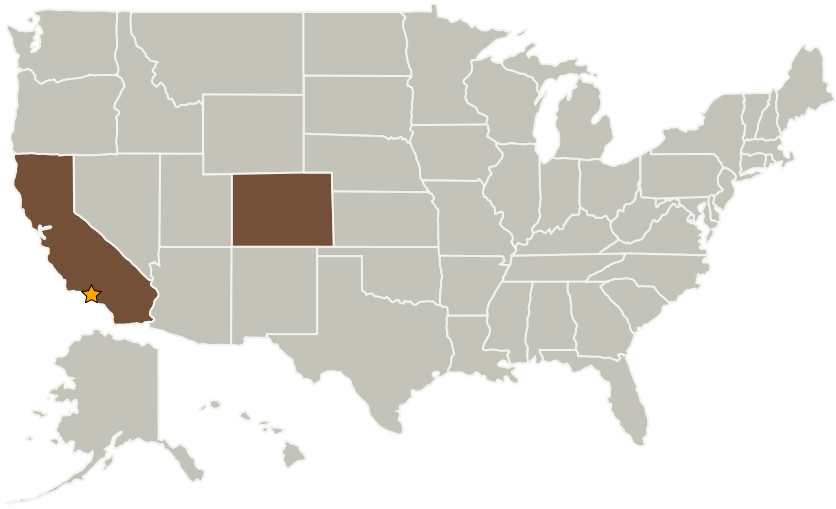
Three Phase Resonant DC Power Converter for Ion Thrusters, Phase II

Completed Technology Project (2004 - 2006)

Project Introduction

Our phase 1 study has revealed many significant benefits of a new class of DC-to-DC power converters with performance that cannot be matched by current flight power systems. The goal of low stored energy has been demonstrated while producing a record-breaking efficiency of 95.5%. This new converter claims this remarkable accomplishment not at just one full power point but at two distinct points. The converter was able to delivery its full rated power of 1kW at 2850V and 5000V load voltages without any physical adjusts. This new converter demonstrated low arc energy and rapid recovery response while powering NEXIS like sub-scale ion optics at Colorado State University. The 1kW prototype's stored energy was less than 1.9mj at 5000Voutput and less than 700?j at 2850V output. In phase 2 we will integrate this new technology into a computerized ion thruster test system capable of delivering 24kW screen power. The planned test system will serve to gain confidence with the new topology and to initiate power system designers to an exciting new technology.

Primary U.S. Work Locations and Key Partners



Three Phase Resonant DC Power Converter for Ion Thrusters, Phase II

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Three Phase Resonant DC Power Converter for Ion Thrusters, Phase II

Completed Technology Project (2004 - 2006)

Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Colorado Power Electronics, Inc.	Supporting Organization	Industry Veteran-Owned Small Business (VOSB)	Fort Collins, Colorado

Primary U.S. Work Locations	
California	Colorado

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.3 Power Management and Distribution
    - TX03.3.3 Electrical Power Conversion and Regulation